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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/970,592	10/04/2001	Bing Wang	6848.US.01	1236

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STEVEN F. WEINSTOCK
ABBOTT LABORATORIES
100 ABBOTT PARK ROAD
DEPT. 377/AP6A
ABBOTT PARK, IL 60064-6008

EXAMINER

SMITH, TYRONE W

ART UNIT PAPER NUMBER

2837

DATE MAILED: 03/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/970,592

Applicant(s)

WANG ET AL.

Examiner

Tyrone W Smith

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11 and 15-18 is/are allowed.
- 6) ☒ Claim(s) 1,5,7-9 and 12 is/are rejected.
- 7) ☒ Claim(s) 2-4,13 and 14 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.

- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 5 and 12 rejected under 35 U.S.C. 102(b) as being anticipated by Coutu (5225756).

Regarding Claims 1, 5 and 12. Coutu discloses a stepper motor driver circuit, which includes comparator circuitry (Figure 1 items 26 and 27) to compare a motor phase current with a reference current and provide an output (refer to Figure 1 items 23, 26, 27, 28, 29 and 30 where the outputs of the comparator connect over lines 28 and 29 with phase A and B drive circuits in indicated when the applied currents have reached their predetermined reference levels). Coutu discloses two EPROM's (Figure 1 items 14 and 15), equivalent to the sine and cosine wave generators disclosed in the invention (column 3 lines 9-15). The motor controller (Figure 1 item 76) coupled to the comparator circuitry and motor phase to adjust the motor phase current in response to the output, the motor current controller selectively uses slow and fast current decay on the motor phase to reduce the motor phase current (column 5 lines 44-68 and column 6 lines 1-35). Further, Coutu can reduce the motor phase current using a fast decay process and use a slow decay process to further reduce the motor phase current.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 7-10 rejected under 35 U.S.C. 103(a) as being unpatentable over Coutu (5225756) in view of Marinko (4336484).

Coutu discloses a stepper motor driver circuit, which includes comparator circuitry (Figure 1 items 26 and 27) to compare a motor phase current with a reference current and provide an output (refer to Figure 1 items 23, 26, 27, 28, 29 and 30 where the outputs of the comparator connect over lines 28 and 29 with phase A and B drive circuits in indicated when the applied currents have reached their predetermined reference levels). Coutu discloses two EPROM's (Figure 1 items 14 and 15), equivalent to the sine and cosine wave generators disclosed in the invention (column 3 lines 9-15). The motor controller (Figure 1 item 76) coupled to the comparator circuitry and motor phase to adjust the motor phase current in response to the output, the motor current controller selectively uses slow and fast current decay on the motor phase to reduce the motor phase current (column 5 lines 44-68 and column 6 lines 1-35). Further, Coutu can reduce the motor phase current using a fast decay process and use a slow decay process to further reduce the motor phase current.

Coutu does not disclose the first and second motor phase current measured using a resistor coupled in series with a winding of the first and second motor phase and a differential amplifier. Marinko discloses a motor control apparatus, which includes first and second motor phase (Figure 1), resistor (Figure 1 items 14A and 14B) coupled in series with a winding(s)

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(Figure 1 items 10A-10B') of the first and second motor phase and differential amplifier (Figure 1 item 26A and 26B). Refer to column 4 lines 42-68 and column 5 lines 1-56.

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Coutu's invention of a stepper motor driver circuit with Marinko's motor control method. The advantage of combining the two would provide a system, which relies an improved current-modulated step motor drive instead of relying primarily on a chopper drive.

5. Claims 2-4, 6, and 13-14 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art(s) of record does not disclose the controller decreasing the motor phase current to the reference current using a fast current decay process and switches to a slow decay process following a defined time period. Further, the defined time period is equal to twice an elapsed time required to reduce the motor phase current to the reference current and the controller decreasing the motor phase current using only a fast current decay is the reference current is zero.

6. Claims 11 and 15-18 in condition for allowance.

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7. The following is an examiner's statement of reasons for allowance of claims 11 and 15-18: The prior art(s) of record does not disclose the controller decreasing the motor phase current to the reference current using a fast current decay process and switches to a slow decay process following a defined time period. Further, the defined time period is equal to twice an elapsed time required to reduce the motor phase current to the reference current and the controller decreasing the motor phase current using only a fast current decay is the reference current is zero. Also, the prior art(s) of record does not disclose when the first motor phase current is greater than the first reference current, reducing the first motor phase current to the first reference current using a fast current decay process until the first motor phase current equals the first reference current.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tyrone W Smith whose telephone number is 703-306-5987. The examiner can normally be reached on weekdays from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Nappi, can be reached on (703) 308-3370. The fax phone number for the organization where this application or proceeding is assigned is 703-308-3431.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1782.


ROBERT E. NAPPI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800